



Alabama Department of Environmental Management



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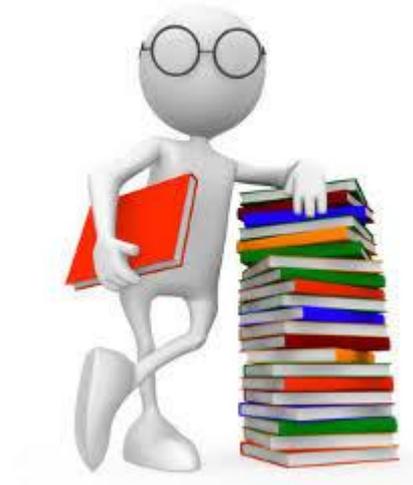
METHOD 150.3 DETERMINATION OF pH IN DRINKING WATER

ADEM Surface Water Meeting
October 23, 2019

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Hach Company

AGENDA

- ❖ Why test for pH
- ❖ What is pH
- ❖ How to test for pH
- ❖ Documentation
- ❖ Probe care



WHY TEST FOR pH

- ADEM

- Division 7 Regs – Drinking Water

- Revised August 9, 2019



- **335-7-2-.02 Sampling and Analytical Requirements**. Samples to be used to demonstrate compliance with these regulations must be collected using procedures, containers, and preservatives established by EPA. Analysis of such **samples must be performed using approved EPA methodology** and by a laboratory certified by EPA or this Department which has demonstrated the ability to analyze the specific contaminants at an acceptable detectable limit established by EPA. **Turbidity, chlorine residual, and secondary standards may be analyzed by a certified operator using procedures established by EPA.** Confirmation samples may be required after the detection of a contaminant or the submittal of results which is questionable.

WHY TEST FOR pH

- ADEM



- Chapter 335-7-10

- Operation, Record Keeping, And Reports

- Section 335-7-10-.03

- (a) At **surface water** or ground water under the influence of surface water treatment plants serving community and NTNC systems, the following tests shall be performed and recorded during plant operation:
 - **6.** pH of the raw and finished water each shift
- (b) At **groundwater** treatment facilities serving community and NTNC systems, the following tests shall be performed and recorded at least daily:
 - **5.** pH of the finished water from each source or plant if a chemical is fed to adjust the pH or if the pH is below 7.0;

WHY TEST FOR pH

- ADEM
 - Chapter 335-7-11
 - Control of Lead and Copper
- 2. The Langelier Index of the water is between -1.0 to +2,

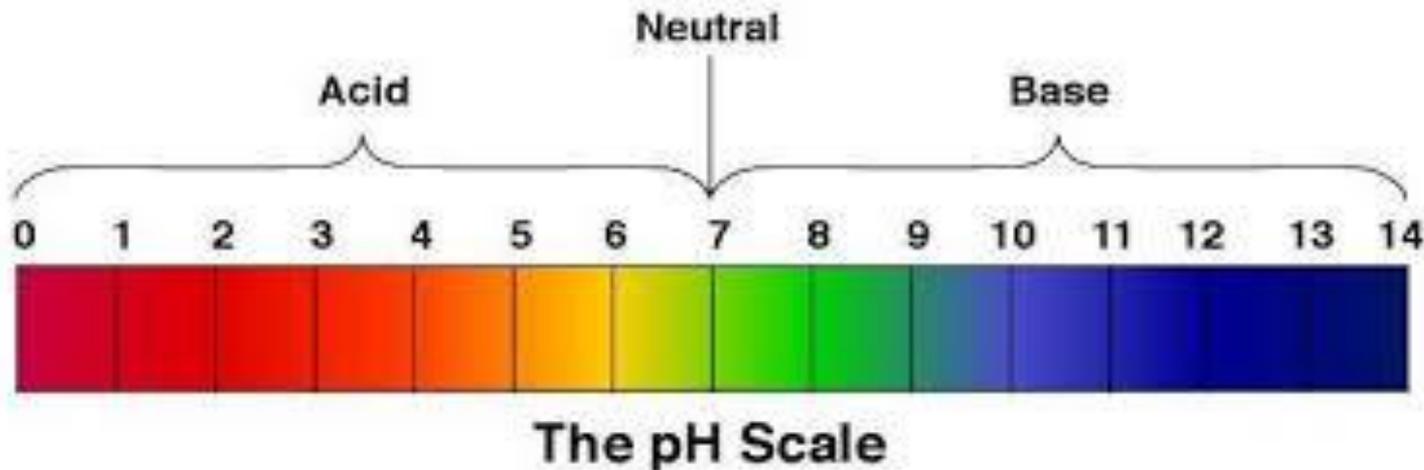


pH is one of the parameters used in the calculation for Langelier Index



WHAT IS pH

- It is roughly the negative of the logarithm to base 10 of the molar concentration, measured in units of moles per liter, of hydrogen ions. More precisely it is the negative of the logarithm to base 10 of the activity of the hydrogen ion. (Wikipedia)
- **How acidic or basic (alkaline) is a substance.**



HOW TO TEST FOR pH

- EPA Method 150.3 :
 - Determination of pH in Drinking Water
 - EPA 815-B-17-001 February 2017



Method 150.3: Determination of pH in Drinking Water



EPA METHOD 150.3 - SUMMARY

- Can use any type meter
 - Bench-top (lab)
 - Portable (field)
 - Continuous (process)



- Report pH with a resolution of 0.1 pH unit
- Proper probe maintenance is required
- Sample must be stirred or swirled – no bubbles

EPA METHOD 150.3 - SUMMARY

- Reference pH Buffers
 - Generally use 4, 7, and 10
 - Adhere to expiration dates (Lot #s)
 - Change out solutions weekly
- Sample Collection
 - Collect approximately 100ml of sample
 - Analyze immediately after collection



EPA METHOD 150.3 – CALIBRATION/VERIFICATION BENCHTOP AND PORTABLE

- Calibration

- Minimum of 2 buffer points (i.e. 7.0 and 10.0)
- At least weekly or if verification is out

- Verification

- After Cal, analyze a different pH buffer (i.e. 4.0)
- Daily
- Must be within +/- 0.1 pH units



EPA METHOD 150.3 – CALIBRATION/VERIFICATION CONTINUOUS USING A PROBE (REMOVABLE)

- Calibration

- Minimum of 2 buffer points (i.e.. 7.0 and 10.0)
- At least weekly or if verification is out

- Verification

- After Cal, analyze a different pH buffer (i.e.. 4.0)
- Must be within +/- 0.1 pH units



DOCUMENTATION OF pH

- Section 9 Quality Control
 - “The laboratory or water system is required to maintain performance records that define the quality of data generated.”
 - Report both pH (nearest 0.1 unit) and temperature (°C) at time of analysis



pH – WHAT IS GOOD

- Record mv from each Buffer
- Record Slope (-59 mv)



Buffer	mv
4.0	160 to 180
7.0	20 to -20
10.0	-160 to -180

pH PROBE CARE

- Consumable item
- Clean occasionally
- Stored properly
 - Do not let go dry
 - Storage Solution



DOCUMENTATION

- **If it's not written down – it wasn't done!**
- **How to prove something was done and done right - years later.**
 - Calibration – tell the instrument
 - Verification – ensure the instrument is correct



Don't call the Nobel Committee just yet:
We forgot to calibrate the instruments
before the experiment...

pH

pH Calibration

EPA 150.3 (DW) OR Standard Methods 4500 H⁺ B-2011 (WW)

Name:

Date / Time:

pH Buffer	Lot Number	Expiration Date	mV reading	Acceptable Range
4.0				+180 to +160
7.0				+20 to -20
10.0				-160 to -180
Known pH				
				Slope (mV and %)

Sample ID	Time	pH Result	Temp °C	Notes
Known				Should be 6.8 +/- 0.3

DOCUMENTATION

- Parameter testing / Method
- Name of technician/operator
- Date & Time of Cal &/or Verification
- Lot #(s) & Expiration Date of Reagents used
- Acceptable value or range
- QC's
- Sample ID
- Sample Result





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QUESTIONS / COMMENTS

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